cause he claims is age, not the absolute age of a species, but its age in the locality. Thus endemic species are rare because they are "in the earlier stages of spreading."

WILLIS treats the two main objections to his theory as follows. The claim that the endemic species are really the oldest he answers with the evidence that frequently endemic species belong to widespread genera. These genera could not have originated in Ceylon; the endemic species must have arrived there late in the history of the genera in question. The other objection, which is merely the claim for natural selection, is that local species develop in response to local needs or conditions; but WILLIS finds that endemic species of a given rarity spread over an area of given diameter, although it may contain other kinds of soils, climates, and floras. Also the geographical boundaries of various endemic species do not coincide; that is, the species do not occupy jointly areas where special local conditions may exist. The arithmetical regularity of distribution of species within the various "rarity classes," and the geometrical regularity of the species boundaries, irrespective of physiographic or meteorologic conditions, must be explained by the mechanical, undifferentiating result of age.

In accordance with this theory, the figures given by WILLIS show that parasites, saprophytes, and climbers are "rarer" than independent plants, as should be expected, for they must have followed the others historically. It also appears that among water plants the dicotyledons are more common (therefore older) than the monocotyledons. Of angiosperms in general, WILLIS found no species that was "dying out." He believes that species die out only by accident, a more extensive accident being necessary for the disappearance of a "common" species than for a "rare one."—MERLE C. COULTER.

Securing complete germinations.—A difficulty often encountered by the geneticist is the failure of many seeds to germinate with desirable promptness. It is well known that in certain species of *Oenothera*, half or more of the seed-like structures contain no embryos, and that in many cases those seeds which do contain embryos are subject to delay in germination. DE VRIES[8] has found that in many cases he can more than double the number of prompt germinations by soaking the seeds for 2 days in water and then subjecting them submerged in water for 24 hours in an autoclave to a pressure of 6–8 atmospheres. The author assumes that the effect is due to the forcing of the water needed for germination through minute rifts in the hard portion of the seed coats. He gives a number of instances to show the contrast between seeds merely soaked, and those which have been subjected to pressure. In certain cases he found it advantageous to subject the seeds a second time to pressure. A very small percentage of the seeds resisted this treatment.

[8] DE VRIES, H., Uber künstliche Beschleunigung der Wasseraufnahme in Samen durch Druck. Biol. Centralbl. **35**:161–176. 1915.

DAVIS[9] has also devised a method for increasing the rapidity and total percentage of germination in *Oenothera* seeds. He places the seeds on pads of filter paper in Petri dishes, adding water until a surplus remains about the edge of the pad. The dishes, covers, papers, and water are all sterilized before the seeds are inserted. The dishes, covered and kept in shaded portions of the greenhouse, showed much more prompt and complete germinations than samples of the same seeds sown in soil. The author notes that after periods of high temperature there followed a burst of germinations, and believes that the best results will be secured by subjecting the dishes of seeds to high temperatures in an incubator. DAVIS points out as one of the distinct advantages of his method that all seedlike structures which fail to germinate remain available for subsequent study.—GEO. H. SHULL.

Color inheritance in Oxalis.—Several wild forms of *Oxalis* growing in nature at Tokyo, Japan, are found by NOHARA[10] to constitute true breeding biotypes, and one wild form indicated its hybrid nature by producing 3 types of offspring in approximately a 1:2:1 ratio. The 4 homozygous biotypes were subjected to genetical analysis by controlled breeding. Reciprocal and double reciprocal combinations yielded only the same results as the single crosses, showing no differential effect of maternal and paternal germ cells. The 4 forms differed from each other in the presence and absence of a purple bar across the base of the petals forming an "eye," and in the occurrence of several degrees of purple coloration in the leaves. The leaf and flower pigmentation are associated, either by linkage or by the production of purple color in the leaves and the purple eye spot in the flowers by the same gene. As one of the true breeding forms has purple leaves and no eye spot, the relation of these characteristics seems to be more logically referable to linkage. The 4 forms differ from one another severally by single factors, thus presenting an instance of BAUR'S "triangle," or multiple allelomorphism, athough the significance of this fact does not seem to have been appreciated by the author. In all crosses the heterozygotes are intermediate between the parents, the F_2 showing ratios approximating 1:2:1, and the F_3 behaviors are typical of Mendelian monohybrids. Three of NOHARA'S forms are recognized by him as the taxonomic forms *O. corniculata* L., *O. stricta* L., and *O. corniculata tropaeoloides* (Schlachter) Makino, and the importance of such genetical studies in the solution of taxonomic problems is made clear.—GEO. H. SHULL.

Relation of leaves to climate.—BAILEY and SINNOTT,[11] in continuing their study of the phylogeny of angiosperms, have begun an investigation of the

[9] DAVIS, B. M., A method of obtaining complete germination of seeds in *Oenothera*, and of recording the residue of sterile seedlike structures. Proc. Nat. Acad. Sci. **1**:360–363. 1915.

[10] NOHARA, S., Genetical studies on *Oxalis*. Jour. Coll. Agric. Imp. Univ. Tokyo **6**:165–182. *pl. 1.* 1915.

[11] BAILEY, I. W., and SINNOTT, E. W., The climatic distribution of certain types of angiosperm leaves. Amer. Jour. Bot. **3**:24–39. 1916.